Public Works (1902) Department.

G.O., No. 659 I

DATED 11th June 1902.

12/6/02

[Despatch Abstract.]

Kothayar dam in Travancore.

Note & blue print by the Chief Engineer for Irrigation on the results of his inspection of the — transferred to the Political Department

100/4

I.

Recd 11/6

P. W. 36.
500—12-8-01.

S.G.M 11/6/02.

IRRIGATION.

Government {1902} of Madras.

PUBLIC WORKS.

Recd.	1902.	*Enclosures*
Regd.		*Spare copies*

G.O., No. 659 I., 11th June 1902.

JUNE.

Kothayar dam in Travancore

Note and blue print by the Chief Engineer for Irrigation on the results of his inspection of the — transferred to the Political Department.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

No. 152 I.

Note by the Chief Engineer for Irrigation.

As directed in G.O., No. 187, Political, dated 4th April 1902, communicated with G.O., No. 1156 W., dated 7th April 1902, I submit, herewith, a note and blue print on the results of my inspection of the Kothayar dam in Travancore. A copy of the note has been sent to the Chief Engineer, Travancore, in advance.

14th May 1902.

(Signed) A. W. SMART, Col., R.E.,
Ag. Chief Engineer for Irrigation.

ORDER—No. 659 I., dated 11th June 1902.

Transferred to the Political Department.

(True Extract.)

(Signed) A. W. SMART, Col., R.E.,
Ag. Joint Secretary to Government,
Irrigation Branch.

Forwarded to the Political Department, with two copies of the note.

Copy to the Public Works Department, General Branch,
with a copy of the note.

Forwarded to the Chief Engineer for Irrigation,
with a copy of the note.

(By order.)

Second Assistant.

Exd. C. Kuppuswami.

KOTHAYAUR IRRIGATION PROJECT—TRAVANCORE.

I inspected the work of the Kothayaur dam in company with Mr. Smith, the Chief Engineer and Mr. Minchin, the Executive Engineer on the 12th April. The following are the points on which my opinion was asked :—

1. Whether the dam as constructed up to date is stable and whether the principles on which the rifts, &c., have been treated are correct and sound.

The only adverse criticism I can make is that the concrete should not have been put in in steps as has been done. But I apprehend no danger from this because first, the steps are almost all below bed level and there is a very considerable backing of rock or hard material on the rear side and second, because by filling in the excavation, in front below bed level and in front of the main alignments, with concrete the section of the dam will be considerably greater than designed. This will add greatly to the strength of the dam.

The rifts found in what was once supposed to be solid rock are being dealt with on sound principles.

The strata in the valley are so much contorted and in parts vertical with fissures in all directions that I expect that there will be, when the dam is completed, considerable sub-soil flow, which will come to the surface in the bed of the river below.

2. Are the materials for the dam and the methods of work good?

Yes. I believe so. The concrete has set well and looks good. The sand used did not appear to me to be as clean as it might be, but without experiment it is impossible to say whether the concrete would be better if the sand were completely freed from all silt and dirt.

3. Are the proposals as to the location of the undersluices and the steps to be taken to protect the river bed from scour below them correct?

Yes. I can suggest nothing better. If the rock below is found unsound a floor will be necessary with a retaining wall below say 50 feet away from lower edge of dam.

4. Will it be safe as proposed to pass the whole or part of the surplus over the dam?

I consider that it would be most unsafe and injudicious to do so. The rock below is not sound, the strata are contorted and almost vertical and will not stand the fall of 30 feet of water.

There are three ways in which the surplus may be passed (1) through the

PWE
5589/2

dam (2) over the right flank escape (3) partly through dam and partly over right flank. If no expensive flooring and training walls are required I would recommend (3). In this case 10,000 cusecs may be passed through the dam and 30,000 cusecs over the right flank. I would recommend the construction of a surplus regulator fitted with 40′ × 6′ shutters at the right flank in place of the present proposals. If it is found that part of the surplus cannot be taken through the dam the whole may be passed at the right flank regulator. This will necessitate the construction of an aqueduct to carry the right bank channel over the surplus but this cannot be helped; unless indeed surplus is all passed through the dam.

5. How would you propose to locate the Right Bank Channel Head sluice (1) in the dam (2) in Allur saddle?

It will be found, I expect, if both proposals are worked out that the sluice will be best located in the dam; this as said against (4) means the construction of an expensive aqueduct but there will be a very heavy and expensive cutting if the sluice is placed in the saddle. However I recommend that a choice be made when both proposals have been fully worked out.

6. Is the site proposed for Left Bank channel sluice suitable?

I cannot suggest any improvement.

7. Is the method of dealing with the disposal of surplus during construction good?

I cannot suggest anything better. The present method gives 6 or 7 months' working season and this is all that can reasonably be expected.

8. How would you propose to convey concrete from mixing platform to upper part of dam? The present proposal is to have an inclined tramway and winding engine, with a line along top of dam if practicable.

The inclined tram on trestles with winding engine is in my opinion preferable to any wire tram suspended from posts. The trestles will have to be substantially built and some of them will be of considerable height. It is unfortunate that there is so little room available, or else the tram line might have been better graded.

GENERAL REMARKS.

Main Dam.—I would recommend large stones being embedded in the concrete. This will add weight to the dam and should lead to some economy. If it is decided to pass part of the surplus through the dam the section where the undersluices are located will have to be increased as shewn in the accompanying tracing. The undersluices may be 7′ × 20′ (height) with floor at 242 or even at 252; they should be fitted with Stoney's shutters. The piers between may be from 15 to 20 feet width.

Undersluices.—The two undersluices 8′ × 4′ (wide) lined with ashlar are to be fitted each with two of Stoney's shutters. One for each in my opinion is suffi-

cient and the two thus saved may be used for other undersluices or for one of the head sluices. The ashlar is of a most substantial description; calculations would shew that the part of the dam where they will be located will be 3 or 4 times as strong as any other part of the dam.

Calculations of Discharge.—In my opinion the discharges over the diversion weir have been overcalculated. In the ordinary formula a co-efficient of a little over ·6 has been taken for all depths passing over the weir. This is clearly wrong in the light of the experiments of the last ten years. I would advise a revision of the calculations to be based on observations of the coming season. The gauge for measuring the head may possibly be correctly placed at 20 to 30 feet above the weir, and the velocity of approach should be measured in a section above this, not between the gauge and the weir as has been the practice hitherto.

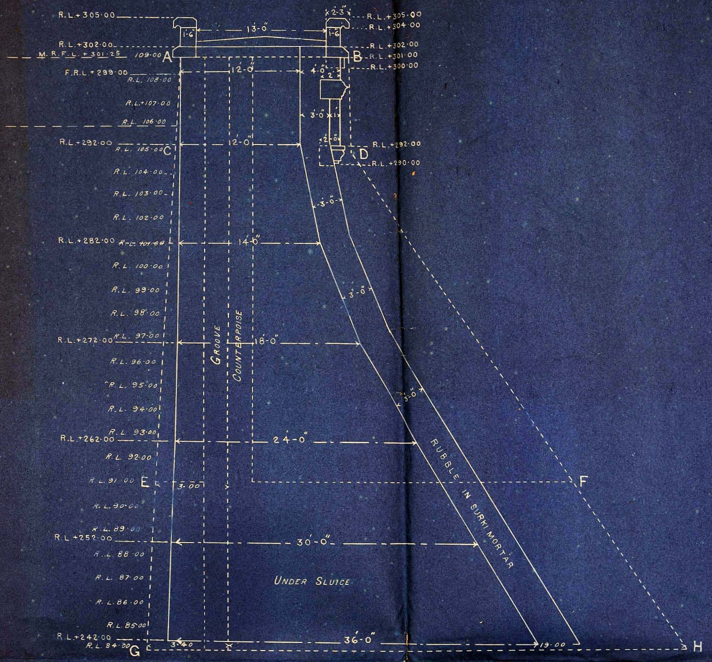
In any case the capacity of the reservoir (5,000 millions cubic feet) against a drainage basin of less than 100 miles and a probably overestimated run off is large and if the duty calculated on is ever to be realised the greatest economy in distribution will become necessary. The old irrigation on the left side will get the first draw and unless the sluices are proportioned to the areas irrigated and placed, when there is scarcity, under a system of turns, the lower irrigation will not get a fair share of the available supply. The absorption in the main channels must be great, although I noticed that in some of the cuttings the spring water is tapped and may compensate to some extent for loss. The country is a difficult one to irrigate, and the main channels are often in heavy embankment, though taken as much as possible on the contour. After seeing the kind of country through which the channels are taken I should never despair of the possibilities of irrigation in almost any conformation.

Puthen Dam.—I would recommend the conversion of this dam into an open regulator with large shutters. This will keep the sand deposits at a lower level and prevent water running to waste over the dam, as it appears to do sometimes now. It is desirable that there should be telephonic or telegraphic communications between here and the main reservoir. The regulation will be much facilitated thereby and great economy of water, with judgment, should result.

Staff employed.—There is one Executive Engineer and one Assistant Engineer with three or four Upper Subordinates under them. The Executive Engineer, Mr. Minchin has a sub-divisional charge as well as the reservoir and main distributaries under him. The main left channel is a very heavy piece of work, with two tunnels and several heavy cuttings and embankments and would have itself given sufficient employment to an executive. I have nothing but praise for the way that the work has been done by Mr. Minchin and his Assistant Mr. Barrow and the subordinate staff under them.

A. W. SMART, Colonel, R.E.,
Ag. Chief Engineer for Irrigation,
Madras.

Ootacamund,
1st *May* 1902.



Dotted line represents section of Assuan Dam
Firm line ------Do------Do-----Kothayar Dam

7/1551
23[illegible]

Pol Dept

The full notes in D.P.W. in this case dont appear to ~~have~~ be with the file. If so will D.P.W. complete it kindly.

[signature] 5/7

D.P.W. U.O.

P.W.D (Irrigation)

D.S.

The originals of G.O. No. 1156 W d/ 7th April 1902 and 1390 W d/ 7th May 1902 passed in the P.W.D (General branch) on the subject have been obtained and are submitted. There are no notes or other papers on record in this Dept.

ASN.
27.5.02.

To Pol. Dept. U.O.

[signature] 28/5/02

The draft G.O. is accepted

[signature] 8/7

[initials]

[signature] 1/6/02

H.E. the Governor
Hon. Mr. J. Thomas
Hon. Mr. G. Stokes

P.W.C. No. 5889
Recd 11-6-02

PUBLIC WORKS DEPARTMENT,

IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Inspection of the Kothayar dam in Travancore

READ the following

Print as in original.

Note by the Chief Engineer for Irrigation. No 152 I dated 14 May/02

As directed in G.O., No.187 Pol. dated 4th April 1902 communicated with G.O., No.1156 W, dated 7th April 1902, I submit herewith a note (and blue print) on the results of my inspection of the Kothayar dam in Travancore. A copy of the Note has been sent to the Chief Engineer, Travancore, in advance.

To the Political Dept (Flag J) for C.I.

Political DEPT.
U.O. No. 34-R
Dated 16-5-1902

Order thereon. No 659 I. d/11.6.1902

Transferred to the Pol.Dept.

14/5/02

14/5/02

Returned for disposal in the Office
9/6/02

To

The Political Dept.with 2 copies of the Note.

3/6/02

Copy to the P.W.D. General Branch, with a copy of the Note.

The Chief Engineer for Irrigation, with -------do-------

Issue

only 11 copies of the Note were printed locally

DESPATCHED 20 JUN 1902

9/6/02

Blue prints sent separately

E. I. Form No. 1—1,000—10-5-01.

90659
11/6/02

U. E. I.

Please say whether ~~the~~ E. I's note just (I) above the order is only to be printed or whether it is intended that printed note
II "Kotharyaur Irrigation Project – Travancore" shd also be printed.

D.G.M.
for A. S.
12/6/02

SCB

~~The~~ H.D. P.W. Secl.

(1) Yes.
(2) No.
Please note that printed copies of the note in the file will have to be attached to the printed copies of the P.M.G.

P.S.
SCB
12/6/02

Des
12/6/02

2 P

22.8.16 BT